CLAIMS

1. A method of measuring performance of a communications channel, comprising:

receiving a signal from the communications channel;

filtering the signal;

estimating a bias introduced by the filtering of the signal; and

computing a parameter of the communications channel as a function of the estimated bias.

2. The method of claim 1 wherein the signal filtering comprises generating a plurality of symbol estimates, the bias estimation being a function of the symbol estimates.

3. The method of claim 2 wherein the bias estimation is further a function of a plurality of second symbols corresponding to the symbol estimates.

4. The method of claim 3 wherein the signal comprises a pilot signal.

5. The method of claim 3 wherein the bias estimation further comprises solving the following equation:

$$\hat{\alpha}_{re} = \mathrm{Re}\left\{\frac{1}{N}\sum_{k=1}^{N}\frac{\hat{y}(k)}{y(k)}\right\}$$

where:

$\hat{y}$ (k) represents the estimated symbols;

y(k) represents the corresponding second symbols; and

N represents the number of samples.

6. The method of claim 1 further comprising estimating a mean square error of the signal, the parameter computation further being a function of the estimated mean square error.

7. The method of claim 1 wherein the parameter computation further comprises computing a carrier-to-interference ratio of the signal.

8. The method of claim 7 wherein the signal filtering comprises generating a plurality of symbol estimates, and the carrier-to-interference ratio computation comprises solving the following equation:

$$\frac{\hat{C}}{I} = \frac{\hat{\alpha}_{re}^{2}\left\{\frac{1}{N}\sum_{k=1}^{N}\|y(k)\|^{2}\right\}}{\hat{MSE}-(1-\alpha_{re})^{2}\cdot\frac{1}{N}\sum_{k=1}^{N}\left\{\|y(k)\|^{2}\right\}} \qquad (10\ 6)$$

where:

y(k) represents a plurality of second symbols corresponding to the symbol estimates;

N represents the number of samples; and

$\hat{\alpha}_{re}$ represents the real component of the estimated bias.

9. A receiver, comprising:

a filter configured to filter a signal from a communications channel;

a bias estimator configured to estimate a bias introduced by the filter; and

a parameter generator configured to compute a parameter of the communications channel as a function of the estimated bias.

10. The receiver of claim 9 wherein the filter comprises a linear filter.

11. The receiver of claim 10 wherein the linear filter comprises a plurality of coefficients configured to be adapted by a least mean square algorithm.

12. The receiver of claim 9 wherein the filter comprises a finite impulse response filter.

13. The receiver of claim 9 wherein the filter comprises an equalizer.

14. The receiver of claim 9 wherein the filter comprises a RAKE receiver.

15. The receiver of claim 9 wherein the filter is further configured to generate a plurality of symbol estimates from the signal, the estimated bias further being a function of the symbol estimates.

16. The receiver of claim 15 wherein the estimated bias is further a function of a plurality of second symbols corresponding to the symbol estimates.

17. The receiver of claim 16 wherein the bias estimator is configured to estimate the bias introduced by the filter by solving the following equation:

$$\hat{\alpha}_{re} = \mathrm{Re}\left\{\frac{1}{N}\sum_{k=1}^{N}\frac{\hat{y}(k)}{y(k)}\right\}$$

where:

$\hat{y}(k)$ represents the estimated symbols; and

y(k) represents the corresponding second symbols; and

N represents the number of samples.

18. The receiver of claim 9 further comprising a mean square error estimator configured to estimate the mean square error of the signal, the parameter generator further being configured to compute the parameter of the communications channel as a function of the estimated mean square error.

19. The receiver of claim 9 wherein the parameter comprises a carrier-to-interference ratio.

20. The receiver of claim 20 wherein the filter is further configured to generate a plurality of symbol estimates from the signal, and the parameter generator is configured to compute the carrier-to-interference ratio by solving the following equation:

$$\frac{\hat{C}}{I} = \frac{\hat{\alpha}_{re}^2 \left\{ \frac{1}{N} \sum_{k=1}^{N} \|y(k)\|^2 \right\}}{\hat{MSE} - (1-\alpha_{re})^2 \cdot \frac{1}{N} \sum_{k=1}^{N} \left\{ \|y(k)\|^2 \right\}}$$

where:

y(k) represents a plurality of second symbols corresponding to the symbol estimates; N represents the number of samples; and

$\hat{\alpha}_{re}$ represents the real component of the estimated bias.

21. Computer-readable media embodying a program of instructions executable by a computer to perform a method of measuring performance of a communications channel from a filtered signal, the method comprising:

estimating a bias introduced by the filtering of the signal;

computing a parameter of the communications channel as a function of the estimated bias.

22. The computer-readable media of claim 21 wherein the filtered signal comprises a plurality of symbol estimates, and the bias estimation is a function of the symbol estimates.

23. The computer-readable media of claim 22 wherein the bias estimation is further a function of a plurality of second symbols corresponding to the symbol estimates.

24. The computer-readable media of claim 23 wherein the bias estimation further comprises solving the following equation:

$$\hat{\alpha}_{re} = \mathrm{Re}\left\{ \frac{1}{N} \sum_{k=1}^{N} \frac{\hat{y}(k)}{y(k)} \right\}$$

where:

$\hat{y}(k)$ represents the estimated symbols;

y(k) represents the corresponding second symbols; and

N represents the number of samples.

25. The computer-readable media of claim 21 wherein the method further comprises estimating a mean square error of the signal, the parameter computation further being a function of the estimated means square error.

26. The computer-readable media of claim 21 wherein the parameter computation further comprises computing a carrier-to-interference ratio of the signal.

27. The computer-readable media of claim 26 wherein the filtered signal comprises a plurality of symbol estimates, and the carrier-to-interference ratio computation comprises solving the following equation:

$$\frac{\hat{C}}{I} = \frac{\hat{\alpha}_{re}^{2}\left\{\frac{1}{N}\sum_{k=1}^{N}\|y(k)\|^{2}\right\}}{\overset{\wedge}{MSE} - (1-\alpha_{re})^{2}\cdot\frac{1}{N}\sum_{k=1}^{N}\left\{\|y(k)\|^{2}\right\}}$$

where:

y(k) represents a plurality of second symbols corresponding to the symbol estimates;

N represents the number of samples; and

$\hat{\alpha}_{re}$ represents the real component of the estimated bias.

28. A receiver, comprising:

filter means for filtering a signal from a communications channel;

bias estimator means for estimating a bias introduced by the filter means; and

parameter computation means for computing a parameter of the communications channel as a function of the estimated bias.

29. The receiver of claim 28 wherein the filter means comprises a linear filter.

30. The receiver of claim 29 wherein the linear filter comprises a plurality of coefficients configured to be adapted by a least mean square algorithm.

31. The receiver of claim 28 wherein the filter means comprises a finite impulse response filter.

32. The receiver of claim 28 wherein the filter means comprises an equalizer.

33. The receiver of claim 28 wherein the filter means comprises a RAKE receiver.

34. The receiver of claim 28 wherein the filter means further comprises means for estimating a plurality of symbols from the signal, the estimated bias further being a function of the symbol estimates.

35. The receiver of claim 34 wherein the estimated bias is further a function of a plurality of second symbols corresponding to the symbol estimates.

36. The receiver of claim 35 wherein the bias estimator means is configured to estimate the bias introduced by the filter by solving the following equation:

$$\hat{\alpha}_{re} = \mathrm{Re}\left\{\frac{1}{N}\sum_{k=1}^{N}\frac{\hat{y}(k)}{y(k)}\right\}$$

where:

$\hat{y}(k)$ represents the estimated symbols;

y(k) represents the corresponding second symbols; and

N represents the number of samples.

37. The receiver of claim 28 further comprising means for estimating a mean square error of the signal, the parameter computation means further being configured to compute the parameter of the communications channel as a function of the estimated mean square error.

38. The receiver of claim 28 wherein the parameter comprises a carrier-to-interference ratio.

39. The receiver of claim 38 wherein the filter means further comprises means for estimating a plurality of symbols from the signal, and the parameter computation means is configured to compute the carrier-to-interference ratio by solving the following equation:

$$\frac{\hat{C}}{I} = \frac{\hat{\alpha}_{re}^{2}\left\{\frac{1}{N}\sum_{k=1}^{N}\|y(k)\|^{2}\right\}}{\hat{MSE} - (1-\alpha_{re})^{2}\cdot\frac{1}{N}\sum_{k=1}^{N}\left\{\|y(k)\|^{2}\right\}}$$

where:

y(k) represents a plurality of second symbols corresponding to the symbol estimates;

N represents the number of samples; and

$\hat{\alpha}_{re}$ represents the real component of the estimated bias.

40. A communications system, comprising:

a first station having a filter configured to filter a signal from a communications channel, a bias estimator configured to estimate a bias introduced by the filter, and a parameter generator configured to compute a parameter of the communications channel as a function of the estimated bias; and

a second station configured to transmit the signal to the first station over the communications system at a data rate selected from a plurality of different data rates, the selected data rate being a function of the computed parameter.

41. The communications system of claim 40 wherein the filter comprises an equalizer.

42. The communications system of claim 40 wherein the filter comprises a RAKE receiver.

43. The communications system of claim 40 wherein the filter is further configured to generate a plurality of symbol estimates from the signal, the estimated bias further being a function of the symbol estimates.

44. The communications system of claim 43 wherein the signal transmitted by the second station to the first station over the communications channel comprises a pilot signal, and the first station further comprises a demodulator configured to extract the pilot signal, the symbol estimates being a function of the extracted pilot signal.

45. The communications system of claim 44 further comprising memory configured to store a plurality of second signals corresponding the pilot signal transmitted by the second station, the estimated bias being further a function of the second symbols.

46. The communications system of claim 45 wherein the parameter generator is configured to estimate the bias introduced by the filter by solving the following equation:

$$\hat{\alpha}_{re} = \mathrm{Re}\left\{\frac{1}{N}\sum_{k=1}^{N}\frac{\hat{y}(k)}{y(k)}\right\}$$

where:

$\hat{y}(k)$ represents the estimated symbols;

y(k) represents the corresponding second symbols; and

N represents the number of samples.

47. The communications system of claim 40 further comprising a mean square error estimator configured to estimate a mean square error of the signal, the parameter computation further being a function of the estimated mean square error.

48. The communications system of claim 40 wherein the parameter comprises a carrier-to-interference ratio.

49. The communications system of claim 48 wherein the filter is further configured to generate a plurality of symbol estimates from the signal, and the parameter generator is configured to compute the carrier-to-interference ratio by solving the following equation:

$$\frac{\hat{C}}{I}=\frac{\hat{\alpha}_{re}^{2}\left\{\frac{1}{N}\sum_{k=1}^{N}\|y(k)\|^{2}\right\}}{\hat{MSE}-\left(1-\alpha_{re}\right)^{2}\cdot\frac{1}{N}\sum_{k=1}^{N}\left\{\|y(k)\|^{2}\right\}}$$

where:

y(k) represents a plurality of second symbols corresponding to the symbol estimates;

N represents the number of samples; and

$\hat{\alpha}_{re}$ represents the real component of the estimated bias.

50. The communications system of claim 48 further comprising a data rate control generator configured to generate a data rate request message as a function of the computed carrier-to-interference ratio.

51. The communications system of claim 50 further comprising a modulator configured to puncture a data packet with the data rate request message and modulate the punctured data packet for transmission from the first station to the second station.

52. The communications system of claim 51 wherein the second station comprises a channel element configured to extract the data rate request message from the punctured data packet transmitted to the second station, the selected data rate being a function of the extracted data rate request message.

53. The communications system of claim 40 further comprising a data rate control generator configured to generate a data rate request message as a function of the computed parameter.

54. The communications system of claim 53 further comprising a modulator configured to puncture a data packet with the data rate request message and modulate the punctured data packet for transmission from the first station to the second station.

55. The communications system of claim 52 wherein the second station comprises a channel element configured to extract the data rate request message from the punctured data packet transmitted to the second station, the selected data rate being a function of the extracted data rate request message.

56. The communications system of claim 48 wherein the first station comprises a mobile subscriber station and the second station comprises a base station.

57. A method of communications, comprising:

receiving, at a first station, a signal from a second station over a communications channel;

filtering the signal at the first station;

estimating, at the first station, a bias introduced by the filtering of the signal;

computing, at the first station, a parameter of the communications channel as a function of the estimated bias; and

transmitting from the second station to the first station the signal at a data rate selected from a plurality of different data rates, the selected data rate being a function of the computed parameter.

58. The method of claim 57 wherein the signal filtering comprises generating a plurality of symbol estimates, the bias estimation being a function of the symbol estimates.

59. The method of claim 58 wherein the signal transmitted from the second station to the first station comprises a pilot signal.

60. The method of claim 59 further comprising, at the first station, extracting the pilot signal transmitted from the second station, wherein the symbol estimates are a function of the extracted pilot signal.

61. The method of claim 60 wherein the bias estimation is further a function of a plurality of second symbols corresponding to the pilot signal transmitted from the second station.

62. The method of claim 61 wherein the bias estimation further comprises solving the following equation:

$$\hat{\alpha}_{re} = \mathrm{Re}\left\{\frac{1}{N}\sum_{k=1}^{N}\frac{\hat{y}(k)}{y(k)}\right\}$$

where:

$\hat{y}(k)$ represents the estimated symbols;

y(k) represents the corresponding second symbols; and

N represents the number of samples.

63. The method of claim 57 further comprising estimating, at the first station, a mean square error of the signal, the parameter computation further being a function of the estimated means square error.

64. The method of claim 57 wherein the parameter computation further comprises computing a carrier-to-interference ratio of the signal.

65. The method of claim 64 wherein the signal filtering comprises generating a plurality of symbol estimates, and the carrier-to-interference ratio computation comprises solving the following equation:

$$\frac{\hat{C}}{I} = \frac{\hat{\alpha}_{re}^{2}\left\{\frac{1}{N}\sum_{k=1}^{N}\|y(k)\|^{2}\right\}}{\widehat{MSE} - (1-\alpha_{re})^{2}\cdot\frac{1}{N}\sum_{k=1}^{N}\left\{\|y(k)\|^{2}\right\}}$$

where:

y(k) represents a plurality of second symbols corresponding to the symbol estimates;

N represents the number of samples; and

$\hat{\alpha}_{re}$ represents the real component of the estimated bias.

66. The method of claim 65 further comprising generating, at the first station, a data rate request message as a function of the computed carrier-to-interference ratio.

67. The method of claim 66 further comprising puncturing, at the first station, a data packet with the data rate request message.

68. The method of claim 66 further comprising modulating, at the first station, the punctured data packet for transmission to the second station.

69. The method of claim 68 further comprising extracting, at the second station, the data rate request message from the punctured data packet transmitted from the first station, the selected data rate being a function of the extracted data rate request message.

70. The method of claim 57 further comprising generating a data rate request message as a function of the computed parameter.

71. The method of claim 70 further comprising puncturing, at the first station, a data packet with the data rate request message.

72. The method of claim 71 further comprising modulating, at the first station, the punctured data packet for transmission to the second station.

73. The method of claim 72 further comprising extracting, at the second station, the data rate request message from the punctured data packet transmitted from the first station, the selected data rate being a function of the extracted data rate request message.

74. The method of claim 57 wherein the first station comprises a mobile subscriber station and the second station comprises a base station.